BCB

Bicolor blackbody

Fig.1. Photo BCB-2D-SEM2 bicolor blackbody

BASIC INFORMATION:

BCB bicolor blackbody is a broadband reference source of optical radiation having emitter module that simultaneously reflects light emitted by an external shortwave light source (source emitting in range from UV to SWIR) and emits longwave thermal radiation in MWIR-LWIR region. The name originates from the fact that it works like a typical blackbody in middle/far infrared range but its emitter appear to be white from middle UV range to middle SWIR range.

BCB bicolor blackbody is built by combining slightly modified (different emitter) TCB differential area blackbody with an exchangeable external light source. A series of light sources can be used as emitters of short wave light (multi-LED, halogen, optional xenon) depending on desired spectral band of emitted light. Design of BCB bicolor blackbody is based on patent pending technology developed by Inframet.

In general BCB bicolor blackbody belongs to a group of broadband radiation sources called fused blackbodies that are offered on international market from several vendors. However BCB bicolor blackbody significantly exceeds performance of similar devices.

In contrast to typical fused blackbodies BCB bicolor blackbody can emit high intensity light in wide spectral band (from middle UV to middle SWIR) behaving at the same time as near perfect blackbody (emissivity over 0.95) in MWIR-LWIR spectral band. The competing fused blackbodies emit light of several times lower maximum luminance at narrow light spectrum and have emitters of lower emissivity at MWIR-LWIR band.

VERSIONS

BCB bicolor blackbodies are modular systems offered in form of a series of versions that differ in blackbody emitter area and type of attached light source. Both emitter size and type of light source are indicated by code of BCB black-body. The code is BCB -XD-Type where X is approximate size of square of the emitter in inches and Type is type of the light source. Following emitters are available:2D, 6D and 8D. Next, four standard light sources SEM1, SEM2, HAL and XEN are offered:

1) SEM1 – light source that emits light having spectrum of roughly 5000K temperature greybody in crucial part of visible band: 450-630nm (see Fig.2). It can be treated as improved typical white LED source.
2) SEM2 – light source that emits light of 5000K temperature greybody spectrum in total VIS band and most of NIR band: 400-850 nm (the spectral band can be expanded) - see Fig.3
3) HAL - light source that emits broadband polychromatic light in VIS-SWIR range. Spectrum of 2856K bicolor temperature in VIS-NIR range (Fig.4).
4) XEN light source built using opto-mechanically controlled xenon bulb that emits light of quasi typical xenon spectrum in in approximate 300 nm to 1100nm band (spectrum can be optionally extended) - see Fig.4.

Code of most popular model is BCB-2D-SEM2. It means emitter size equal to 2” and SEM2 light source is used.

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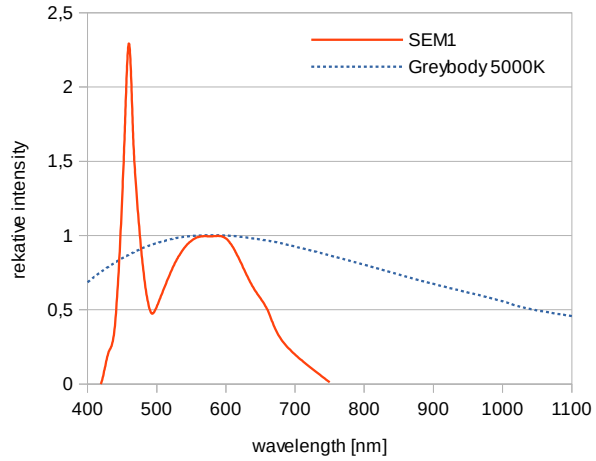

Fig.2. Relative spectrum of SEM1 light source

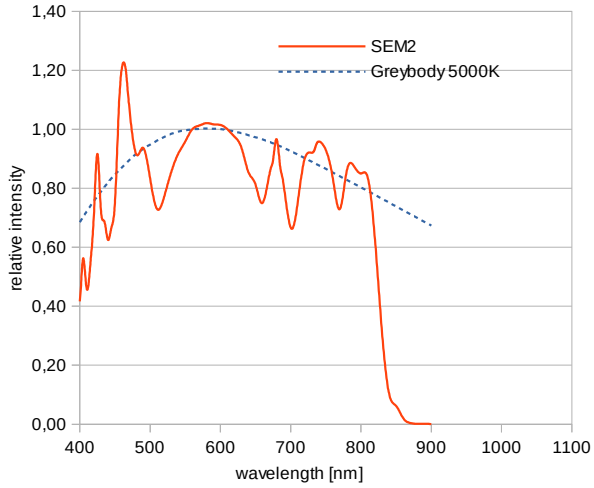

Fig.4. Relative spectrum of SEM2 light source

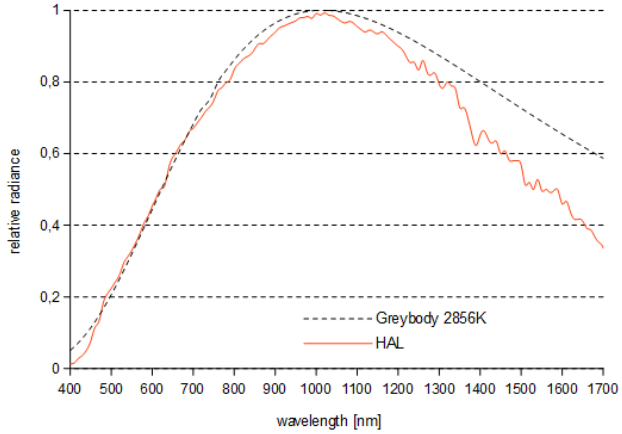

Fig.3. Relative spectrum of HAL light source

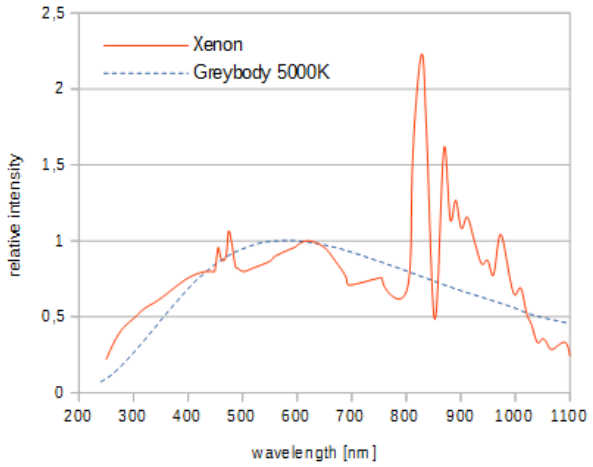

Fig.4. Relative spectrum of XEN light source

OPTIONS

1. Typical BCB bicolor blackbodies use four types of light sources of spectrum seen in Figs. 2-4. However light sources of different spectrum can be optionally delivered, too.
2. Typical BCB bicolor blackbodies are manufactured to simulate day light conditions. However, they can be delivered in version of expanded light intensity range capable to simulate both day and night light conditions.
3. Typical BCB bicolor blackbody emits polychromatic broadband light and is calibrated in photometric units. However, special BCB blackbody emitting monochromatic light can be delivered. Such bicolor blackbody is calibrated in radiometric units.

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SPECIFICATIONS

BCB bicolor blackbody is typically offered with 2” emitter size and the specification below refer to BCB-2D model.

Table 1. Parameters of BCB-2D blackbodies

Parameter	Value
Blackbody mode	
Active aperture	35x35 mm
Emitter size	50× 50 mm
Absolute temperature range	0°C ÷ +100°C at 25°C ambient temperature
Differential temperature range	–25°C ÷ + 75 °C
Effective emissivity	0.95±0.01 at MWIR 0.96±0.01 at LWIR
Temperature spatial distribution uncertainty (temperature uniformity)	<0.01 °C or 0.4% of ΔT
Set point and resolution	1 mK
Regulation stability	±3 mK @ ΔT=10°C
Total temperature uncertainty	Abs(T-25°C)+12[mK]
Heating rate[2]	0.8ºC/sec
Cooling rate	0.3ºC/sec
Settling time	<30sec
Light source mode	
Active aperture	35x35 mm
Approximate spectral band	420-750nm – SEM1 version 380-850nm -SEM2 version 350 - 1700 nm - HAL version 300-1100nm -XEN version
Luminance range	at least 0.2 to 2000cd/m^2 - SEM1/SEM2/XEN at day option at least 0.0002 to 2000cd/m^2 - SEM1/SEM2/XEN at day/night option at least 0.1 to 800cd/m^2 - HAL at day option at least 0.0001 to 800cd/m^2 - HAL at day/night option
Spectrum of light source	As in Figs. 2-4
Other parameters	
Computer control	USB 2.0
Power supply	115-230VAC 50/60Hz
Operating temperature	+5°C ÷ +45°C (non condensing)
Storage temperature	–10°C ÷ +60 °C
Dimensions	About 50x31x34
Mass	9-14 kg depending on version

SUMMARY

BCB bicolor blackbody is a perfect solution for a broadband reference source in systems for testing multi-sensor/fused surveillance systems eliminating need for mechanical exchange of typical blackbody with typical light source and making the test system more compact, lighter and more reliable. Next, performance parameters of BCB bicolor blackbody significantly exceed parameters of similar radiation sources offered on international market.

Version 3.1

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